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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,869	08/04/2003	Rick K. Dodge	ITO.0050US (P16247)	5264

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EXAMINER

DANG, PHUC T

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/633,869	Applicant(s) DODGE, RICK K.	
	Examiner PHUC T DANG	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed March 25, 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-22 is/are allowed.
- 6) ☒ Claim(s) 1-3, 23, 24, 26 and 27 is/are rejected.
- 7) ☒ Claim(s) 4-10, 25 and 28-30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Applicant's argument filed on March 25, 2005 has been considered but are moot in view of the new ground(s) of rejection.

Claim Objection

2. Claim 1 is objected to because of the following reasons:

In claim 1, line 3, a term "... another region of the layer." should amend to -- ... another region of said layer --.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
3. Claims 1-3, 23-24 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez et al., hereinafter "Gonzalez" (U.S. Patent No. 6, 300,684).

Regarding claims 1 and 23-24, Gonzalez discloses a method comprising:

forming a phase change memory pore (7, Fig. 1) including a breakdown layer (4, Fig. 1) which positioned between a pair of electrodes (6 and 3, Fig. 1) and increasing the likelihood that the breakdown will occur in one region rather than another region of said layer.

The voltage breakdown can happen between the lower electrode (3, Fig. 1) and the upper electrode (6, Fig. 1) that resulting a conductive path is conducted via the pore (7, Fig. 1) through the memory cell as shown in Fig. (1). Thus, the breakdown can occur in

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one region rather than another region of the breakdown layer as claimed in claims 1 and 23 on the breakdown layer depending on the energy absorbed in the shape of the active region of the phase memory pore, the size of the pore and the thickness of the breakdown layer as suggested in Figs. 1, 4-5 and 8-11 and col. 2, lines 32+ of the Gonzalez reference. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching of Gonzalez discussed above such that the breakdown layer being ion implanted to increase the likelihood that breakdown will occur in one region rather than another region of the layer for a purpose of improving a phase change memory.

Regarding claim 2, Gonzalez discloses a step of forming a phase change memory pore by forming an electrode (3, Fig. 1) over a substrate, forming a dielectric layer (2, Fig. 1) with an aperture (7, Fig. 1); and forming a breakdown layer (4, Fig. 1) over the electrode (3, Fig. 1) in the aperture.

Regarding claim 3, Gonzalez discloses forming a phase change material over the layer and coupling the phase change material between the upper conductive (6, Fig. 1) and a lower conductive film (3, Fig. 1).

Regarding claim 26, Gonzalez discloses a memory comprising:

a breakdown layer (4, Fig. 1) between a pair of electrodes (3 and 6, Fig. 1), the breakdown layer having a central region (Figs. 1-3) and a peripheral region (Figs. 1-3) between the electrodes (3 and 6, Fig. 1), such that breakdown is more likely to occur in one of the regions than the other of the regions.

Similar to claims 1 and 23, the voltage breakdown can happen between the lower electrode (3, Fig. 1) and the upper electrode (6, Fig. 1) that resulting a conductive path is

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conducted via the pore (7, Fig. 1) through the memory cell as shown in Fig. (1). Thus, the breakdown can occur in one of the regions than the other of the regions as claimed in claim 26 on the breakdown layer depending on the energy absorbed in the shape of the active region of the phase memory pore, the size of the pore and the thickness of the breakdown layer as suggested in Figs. 1, 4-5 and 8-11 and col. 2, lines 32+ of the Gonzalez reference. Therefore, it would have been obvious to one having ordinary skilled in the art at the time the invention was made to modify the teaching of Gonzalez discussed above such that the breakdown layer being ion implanted to increase the likelihood that breakdown will occur in one region rather than another region of the layer for a purpose of improving a phase change memory.

Regarding claim 27, Gonzalez discloses the phase change material (5, Fig. 1) between the electrodes (3 and 6, Fig. 1).

Allowable Subject Matter

4. Claims 11-22 would be allowed.

The following is a statement of reason for the indication of allowable subject matter:

Claims 11-22 are considered allowable since the prior art of record and the considered pertinent to the applicant's disclosure does not teach or suggest the claimed invention having a breakdown layer between a pair of electrodes, the breakdown layer being ion implanting to increase the likelihood that breakdown will occur in one region rather than another region of the breakdown layer.

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Claims 4-10, 25 and 28-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the Prior Art made of record discloses including coupling a lower conductive line to said electrode through a selector as cited in claim 4 and the ion implanting a portion of the breakdown layer to change the likelihood of breakdown in that implanted portion relative to an unimplanted portion of the breakdown layer as cited in claim 5 and a step including forming a relatively centrally located within the pore that is more likely to breakdown as cited in claim 8 and a step including forming a relatively peripherally located region in the pore that is more likely to breakdown as cited in claim 9 and a step including damaging one region of said layer to change the likelihood that a breakdown will occur in that region relative to another region as cited in claim 10 the ion implanting of the breakdown layer as cited in claim 25 and the breakdown layer is ion implanted as cited in claim 28.

Claims 6- 7 are depend directly or indirectly on claim 5 and claims 29-30 are depend on claim 28, then, it also would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.
6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

7. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

Primary Examiner

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PD 